## 2011 NH Volunteer River Assessment Program Annual Training Workshop



May 14, 2011

### Housekeeping

- ☐ In the Event of an Emergency
- □ Restrooms

### Informational Packets

- Left Side
- □ VRAP Fact Sheet
- ☐ Interpreting VRAP Water Quality Parameters
- ☐ Troubleshooting Guide to VRAP Water Quality Meters

- Right Side
- ☐ Agenda/Evaluation Form
- ☐ Activity Instructions
- ☐ 2011 Field Data Sheet
- □ Protocols

### "Group Leader" Packets

- ☐ Sampling Station List (NHDES ID, Elevation, Etc)
- ☐ Field Data Sheets for Sampling Season

### **Introductions: VRAP Staff**

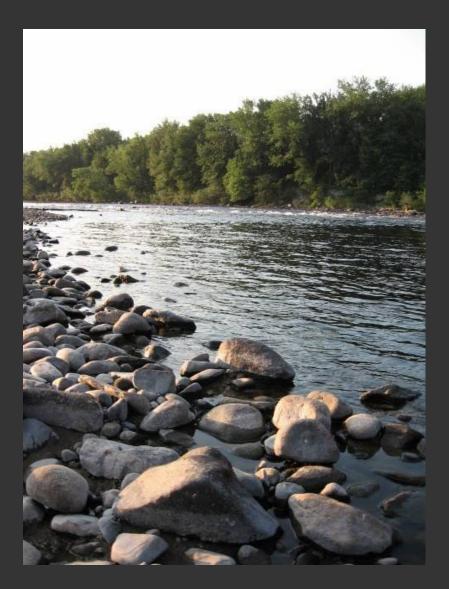
Jen Drociak, VRAP Coordinator (603) 271-3307 jen.drociak@des.nh.gov

Ted Walsh, VRAP Manager (603) 271-2083 ted.walsh@des.nh.gov

Introductions: VRAP Volunteers

### What is VRAP?

- ☐ Established in 1998 to promote awareness & education of the importance of maintaining water quality in NH's rivers and streams.
- ☐ Cooperative program between volunteer monitors, local river groups and NHDES.
- ☐ Designed to coordinate, support, and improve volunteer water quality monitoring coverage of NH's rivers and streams.



### Why is VRAP Important?

- ☐ Assists and supplements NHDES efforts in evaluating water quality throughout NH.
- ☐ Empowers volunteer monitors with information about the health of NH's rivers and streams.
- ☐ Builds a strong set of background data and to start determining long-term trends.
- ☐ Early detection of water quality changes, allowing NHDES to trace potential problems to their source.
- □ Data are used to assess the quality of NH's rivers and streams (report to EPA and Congress).

#### Volunteers testing river health

#### Ongoing project keeps tabs on watershed

By VICTORIA GUAY

GILMANTON — Two women from Gilmanton and Loudon have teamed up to test the ponds and streams that make up the Soucook River Watershed.

Nancy Stearns, chairman of filmanton's Conservation Commission and Sandy Blanchard, ibrary trustee and historical socity member in Loudon, are particpating in the Volunteer River assessment Program, sponsored by the New Hampshire Department of Environmental Services.

The two get up early every other friday and travel to seven sites in the Soucook Watershed, including Rocky Pond and Loon Pond. They test samples of the water with equipment provided by the DES, and they turn their results in

Steams said they test for things uch as oxygen in the water, turidity, conductivity, color, and dor. She and Blanchard have een testing since late May, teams said she got involved in he project to monitor the state of illmanton's waters.

"I'm interested too in seeing that the impact in Gilmanton is om the gravel pits and other eveloping areas," said Stearns.
Blanchard said she got involved or much the same reason.

"I got involved out of a desire to eep our community as pristine as ossible." said Blanchard.

"We enjoy doing it because ware," added Stearns.

At the Rocky Pond test-site, both omen are a little concerned over the low water levels, and the evi-

"This is the lowest it's been all year," said Stearns, who guessed he pond to be about a foot below

WATERSHED, Page A6



Sandy Blanchard, foreground, and Nancy Steams test the water quality at the outlet of Rocky Pond in Canterbury Members of the Volunteer River Assessment Program, the two women test seven sites in the area on a bi-weekly basis.

(Citizen Photo/Daryl Carlso

### **How Does VRAP Work?**

#### The Role of VRAP Staff

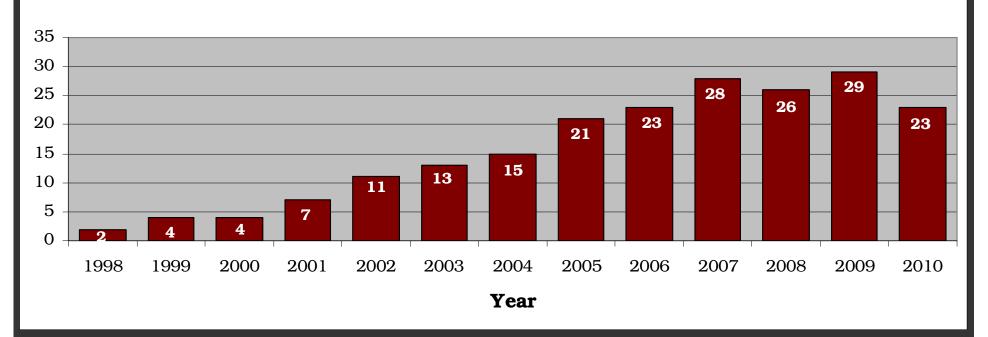
	□ Provide Assistance with Annual Sampling & Analysis Plan (Sampling Stations, Sampling Schedule, Lab Analysis/Budget).							
	Coordinate Annual Training Workshop(s).							
□ F	Provide Equipment/Supply Loans & Maintenance.							
□ F	Provide Technical Assistance / Outreach & Education.							
	Coordinate Annual Field Visit/Audit.							
□ F	Provide Monitoring Protocols & Field Data Sheets.							
□ F	Provide Quality Assurance and Quality Control (QA/QC) Guidelines.							
_ \	Write Annual Water Quality Report.							

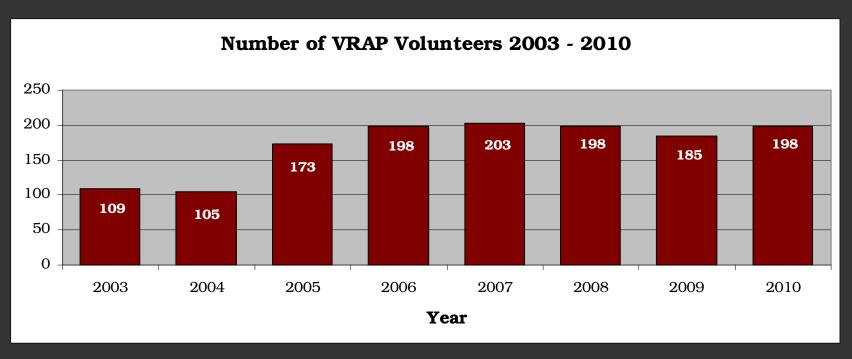
### **How Does VRAP Work?**

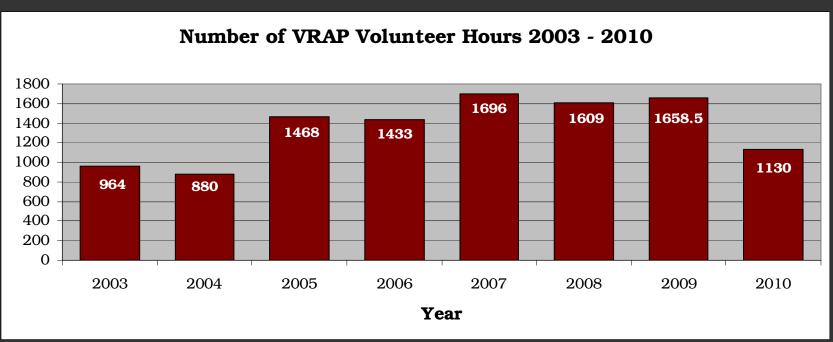
#### The Role of the Volunteer Monitor

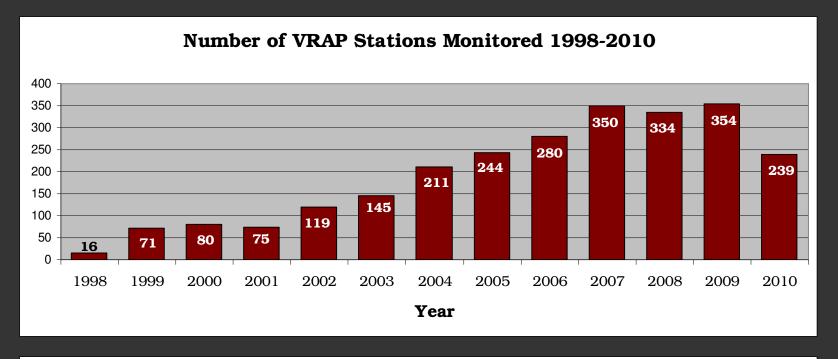
□ Notify VRAP Coordinator of sampling dates.
☐ Schedule equipment and sample bottle pick-up & drop-off.
☐ Contact VRAP Coordinator to schedule annual field visit/audit.
☐ Collect water samples at least once per month (typically June, July, Aug).
☐ Deliver collected water samples to Limnology Center within allotted holding times.
☐ Provide minimal financial support for sample analysis.
☐ Report potential water quality violations to NHDES.
☐ Relay water quality information to associations, community & town officials.

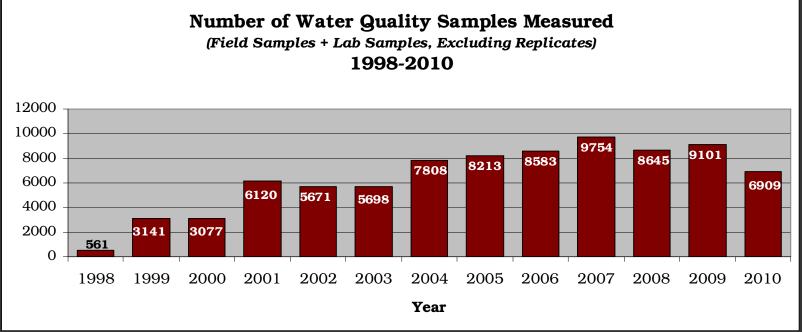








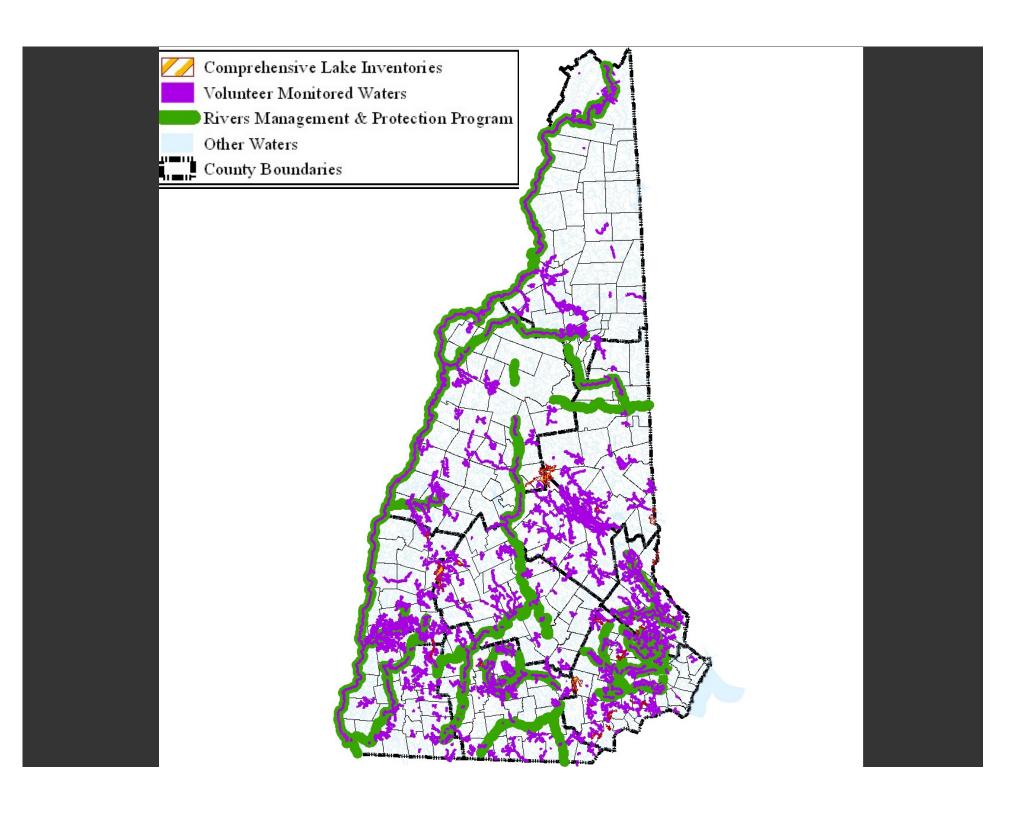




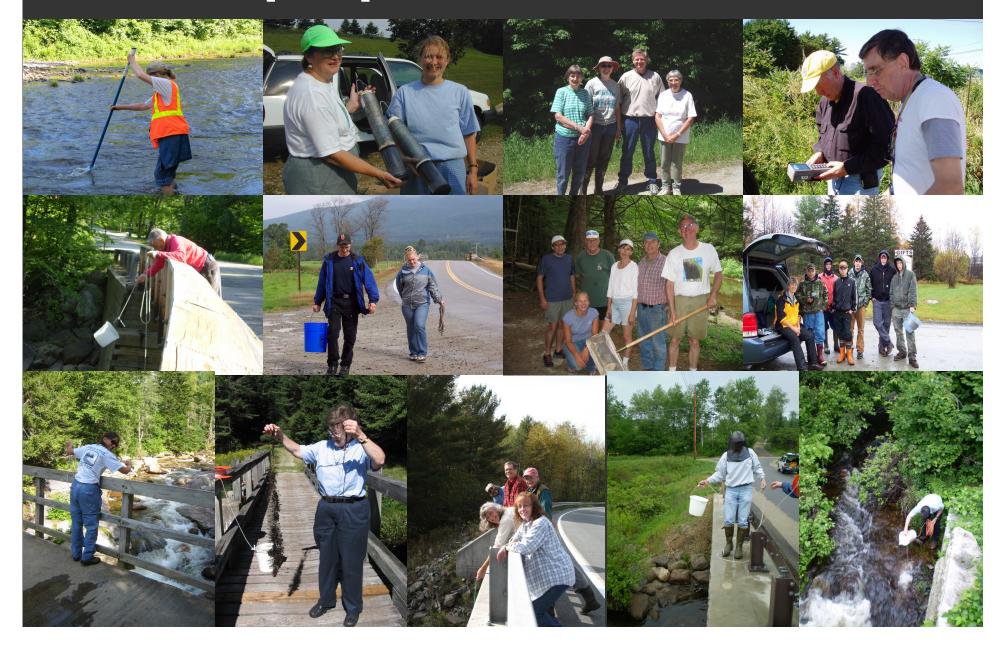
Year	# VRAP Groups	# Stations Monitored	# Samples Measured	# Volunteers	# Volunteer Hours	Value of "In Kind" Contribution	
1998	2	16	561	Unaccounted For	Unaccounted For	Unaccounted For	
1999	4	71	3,141	Unaccounted For	Unaccounted For	Unaccounted For	
2000	4	80	3,077	Unaccounted For	Unaccounted For	Unaccounted For	
2001	7	75	6,120	Unaccounted For	Unaccounted For	Unaccounted For	
2002	11	119	5,671	Unaccounted For	Unaccounted For	Unaccounted For	
2003	13	145	5,698	109	964.0	\$16,571.16 (\$17.19/HR)	
2004	15	211	7,808	105	879.5	\$15,435.23 (\$17.55/HR)	
2005	21	244	8,213	173	1,467.5	\$26,473.70 (\$18.04/HR)	
2006	23	280	8,583	198	1,433.0	\$26,897.41 (\$18.77/HR)	
2007	28	350	9,754	203	1,695.8	\$32,747.54 (\$19.51/HR)	
2008	26	361	8,645	198	1,609.0	<b>\$32,582.30</b> (\$20.25/HR)	
2009	29	354	9,101	185	1,658.5	<b>\$34,579.70</b> (\$20.85/HR)	
2010	23	239	6,909	198	1,130.0	<b>\$24,126.10</b> (\$21.36/HR)	
			00.004			0000 440 44	

83,281

\$209,413.14



## Keep Up the Good Work!



## Quality Assurance / Quality Control (QA/QC) & Collecting Usable VRAP Data



### **Quality Assurance/Quality Control**

(Page 5 of Protocols)

- 1. Initial Turbidity Meter Check/Calibration (1.0 NTU Standard) & Conductivity Meter Check (2,000 Standard)
- 2. pH & Dissolved Oxygen (DO) Calibration:
  - pH: Calibrated at each station with 7.0 & 4.0 pH Standards Calibration Slope of 92-102%.
  - DO calibrated at each station based on Altitude (In Hundredths of Feet).

    Chamber Reading within 2% of Known Calibration Value.
- 3. Replicate Analysis (Once Daily, Same Sample Water)
- QA/QC Meter Checks (Once Daily):
  - 4. 6.0 pH Standard
  - 5. Zero Oxygen Solution
  - 6. DI (De-Ionized) Turbidity Blank
- 7. End of the Day Conductivity & Turbidity Meter Check

### 2010 QA/QC Data Summary Statistics

Type of Sample	# Samples Collected	# Invalid Samples	% Invalid Samples	% Valid Samples Usable for 2012 NHSWQ Assessments
Number of Field Parameters	7,453	304	4.08%	95.92%
Number of Laboratory Parameters	777	02	0.26%	99.74%
Total Number of Samples (Field + Lab)	8,230	306	3.72%	96.28%

2009: 95.77% 2008: 96.69%

## 2010 Summary of Data Verification: Field Parameters

Parameter	Parameter Count for Routine Samples Only	Invalid Count	% Invalid
■ Dissolved Oxygen (% Sat.)	1,235	083	6.72
■ Dissolved Oxygen (mg/L)	1,234	103	8.35
■ pH	1,254	016	1.28
Specific Conductance	1,288	062	4.81
Turbidity	1,196	030	2.51
■ Water Temperature	1,246	010	0.80
TOTALS	7,453	304	4.08%

### 2010 Summary of Data Verification: Lab Parameters

Parameter	Parameter Count for Routine Samples Only	Invalid Count	% Invalid
■ Chloride (mg/L)	166	00	0.00
■ <i>E.coli</i> (#/100mL)	428	02 Issue of Sample Holding Time	0.47
■ Total Phosphorous (mg/L)	183	00	0.00
Total	777 02		0.26
TOTALS	8,230	306	3.72%

### Why Is Data is Invalidated?

All data from the sampling date invalidated:

1. A Replicate sample was not taken.



- 1. Meters were not calibrated prior to use.
- 2. Calibration Values were not in acceptable range.
- 3. QA/QC Meter checks were not performed.
- 4. Data fails QA/QC "Relative Percent Difference" (RPD) or Absolute Difference.

## Tips to Prevent Dissolved Oxygen Measurements from Failing QA/QC & Being Invalidated

- ☐ Ensure DO Calibration Value (known value based on altitude) & % Saturation Chamber Reading (actual value after Calibrating) are within 2% of eachother.
- ☐ With probe in sample, wait for the DO % saturation to stabilize!
- ☐ Then press "Mode" and immediately take mg/L value. (If you wait for mg/L to stabilize, it won't correspond to % sat)

## Tips to Prevent Specific Conductance Measurements from Failing QA/QC & Being Invalidated

- □ Ensure standard/water sample covers holes on top of probe (probe immersed in standard or sample).
- ☐ Flashing C for Specific Conductance (Temperature Compensated).
- ☐ Wait for value to stabilize.

### Data Use & Reporting



### **Annual VRAP Reports**

- □ January/February
- □ Section of Report for Each Analyte
- □ Data Table Summaries
- ☐ Graphs
- □ Annual Data Appendix
- □ What data meets/fails NH Surface Water Quality Assessments
- ☐ Available On-line
- ☐ Encourage to share with your town!

New Hampshire Volunteer River Assessment Program 2010 Ammonoosuc River Water Quality Report





February 2011

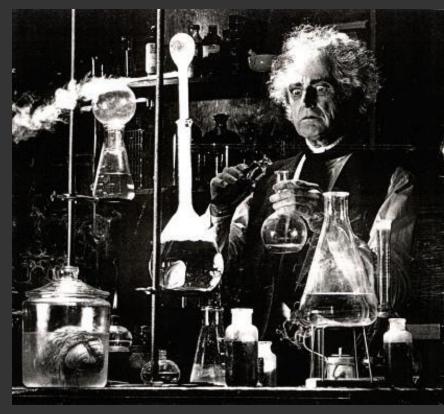
### Water Quality Assessments

- ☐ Measurements taken by volunteers that have passed Quality Assurance and Quality Control (QA/QC) criteria are used in assessing the water quality of New Hampshire's river and streams, and are included in reporting to the US Environmental Protection Agency (EPA) every two years.
- ☐ The 2010 surface water quality assessments of riverine assessment units include over 68,000 water quality standard comparisons of which nearly 40% came from volunteer sampling efforts.
- ☐ Thanks to this volunteer data contributed to the assessment of 1,432 miles of rivers and streams on 310 riverine assessment units!

# Interpreting VRAP Water Quality Parameters (Handout)

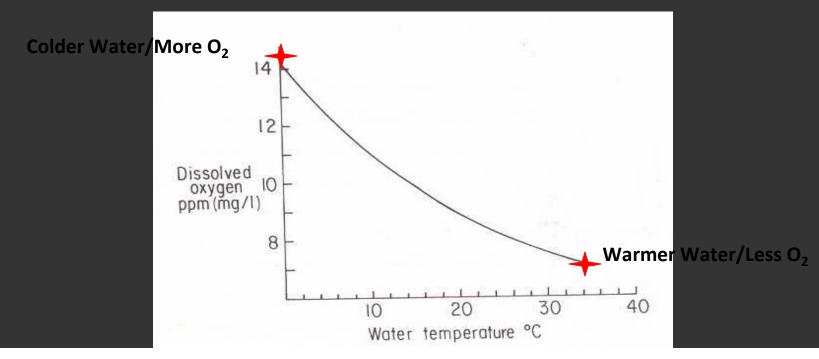
http://des.nh.gov/organization/commissioner/pip/publications/wd/documents/vrap parameters.pdf





### Dissolved Oxygen

- □ Unit of Measurement: Concentration (mg/l or ppm) & Saturation (%)
- $\square$  Description: Measure of amount of  $O_2$  that water can hold in solution.
- ☐ Sources: Wind/wave action, photosynthesis (algae and plants).
- ☐ Uses: Algae/plants, bacteria, fish (respiration).
- ☐ Importance: Inverse relationship between dissolved oxygen and water temperature.

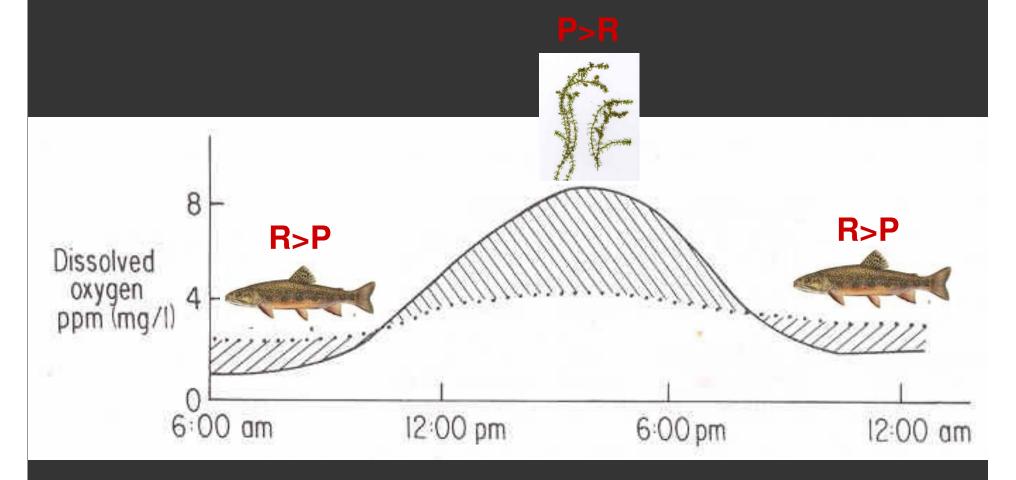


### Influences on Dissolved Oxygen

#### Photosynthesis:

 $\square$  Day =  $\uparrow$  Sunlight =  $\uparrow$  Photosynthesis (green plants and algae) =  $\uparrow$ **Dissolved Oxygen in Solution.** □ Night =  $\downarrow$  Sunlight =  $\downarrow$  Photosynthesis &  $\uparrow$  Respiration =  $\downarrow$ Dissolved Oxygen in Solution ☐ Dissolved Oxygen levels are highest in late afternoon and lowest just before sunrise. Respiration: ☐ Consumes O₂ and produces CO₂ ☐ Continues during night so DO levels are usually reduced by morning. ☐ Waters with higher levels of organic matter have more respiration occurring during decomposition, which causes lower levels of DO. Waters with rocky bottoms generally have less organic matter and tend toward a higher DO count.

### Daily Changes in Dissolved Oxygen



- ☐ P = Photosynthesis
- □ R = Respiration

### NH Surface Water Quality Standards

- □ Class A NH Surface Water Quality Standard: 6 mg/L at any place or time, or 75% minimum daily average (unless naturally occurring).
- □ Class B NH Surface Water Quality Standard: 5 mg/L at any place or time or 75% minimum daily average (unless naturally occurring).
- □ Several measurements of oxygen saturation taken in a 24-hour period must be averaged to compare to the 75% daily average saturation standard.

### Water Temperature

- ☐ Unit of Measurement: Degrees Celsius.
- ☐ Description: The temperature of the water.
- ☐ Importance: Influences rate of many physical, chemical, and biological processes. Species have a range of temperature and other factors that best support their reproduction and survival.
- ☐ Major determinant of the occurrence of plants and animals.
- ☐ Heavily shaded banks help to moderate H₂O temperature.
- $\Box$  H<sub>2</sub>O is generally warmer in the lower stretches of rivers, with slight thermal stratification occurring in slow, deep sections.
- □ Dams can cause the river to be either cool or warm, depending on whether the river flows from the bottom or over the dam.

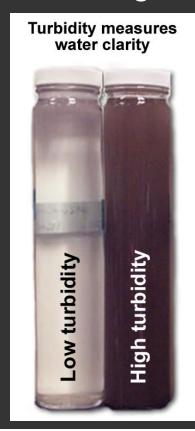


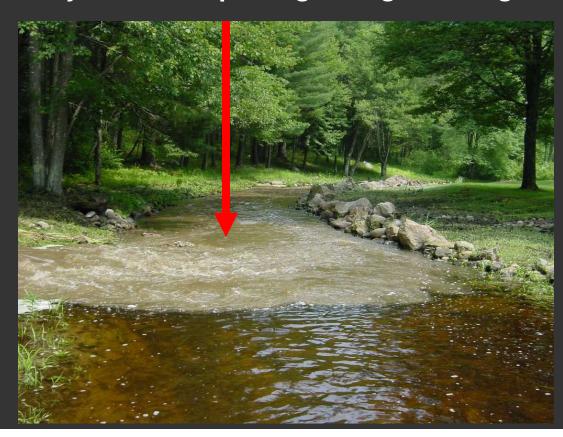
### NH Surface Water Quality Standards

- ☐ Class A NH Surface Water Quality Standard: As naturally occurs.
- ☐ Class B NH Surface Water Quality Standard: No numeric standard.
- □ Although there is currently no numerical water quality criteria for water temperature, NHDES is in the process of collecting biological and water temperature data that will contribute to the development of a procedure for assessing rivers and stream based on water temperature and its corresponding impact to the biological integrity of the waterbody.

### **Turbidity**

- ☐ Unit of Measurement: Nephelometric Turbidity Units (NTU)
- □ Description: Measure of amount of suspended material in water.
- ☐ Sources: Clay, silt, algae, suspended sediment, decaying plants.
- ☐ Importance: High turbidity can affect passage of light through water.





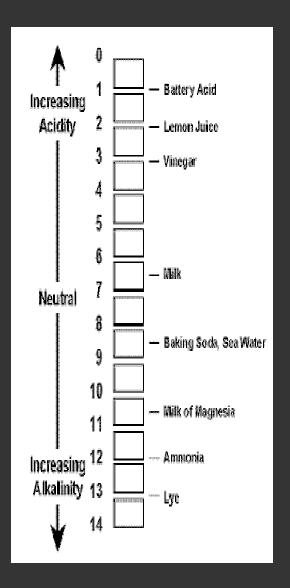
### NH Surface Water Quality Standards

- ☐ Class A NH Surface Water Quality Standard: As naturally occurs.
- ☐ Class B NH Surface Water Quality Standard: Shall not exceed naturally occurring conditions by more than 10 NTU.

### pН

	U	nit	of	М	easurei	men	t• I	Units
-				V.A.I				

- $\square$  Description: Measure of hydrogen ion activity in H<sub>2</sub>0 (acidity of water). Logarithmic scale 0-14 (7 neutral).
- $\Box$  High pH = alkaline (or basic) conditions.
- □ Low pH = acidic conditions (or naturally occurring in bogs/wetlands).
- ☐ Importance: Affects survival and reproduction of fish/aquatic life.
- ☐ Measurements outside organism's range can limit growth and reproduction.
- □ Low pH can also affect the toxicity of aquatic compounds such as ammonia and certain metals making them more "available" for uptake by aquatic plants and animals.

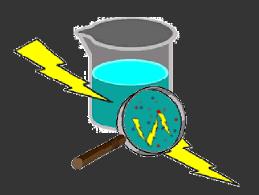


### NH Surface Water Quality Standards

- ☐ Class A/B NH Surface Water Quality Standard: Between 6.5 and 8.0 (unless naturally occurring).
- □ Sometimes, readings that fall below this range are determined to be naturally occurring. This is often a result of wetlands near the sample station.
- ☐ Wetlands can lower pH because the tannic and humic acids released by decaying plants can cause water to become more acidic.

### **Specific Conductance**

- ☐ Unit of Measurement: Microseimens/cm (uS/cm)
- □ Description: Numerical expression of the ability of water to carry an electrical current at a specific water temperature and a measure of free ion (charged particles) content in the water.
- □ Sources: Natural (bedrock), Human (stormwater runoff).
- ☐ Importance: High specific conductance values may indicate pollution from sources such as road salting, septic systems, wastewater treatment plants, or urban/agricultural runoff.



# NH Surface Water Quality Standards

□Class A/B NH Surface Water Quality Standard: No numeric standard.

Although NH surface water quality standards do not contain numeric criteria for specific conductance, the NH Consolidated Assessment and Listing Methodology (CALM) allows for instantaneous specific conductance measurements to be used as a surrogate to predict compliance with numeric water quality criteria for chloride. NHDES has developed a statewide specific conductance to chloride relationship based on simultaneous measurement of specific conductance and chloride.

The Class A/B New Hampshire surface water quality standard for chloride and corresponding specific conductance measurements are as follows:

Freshwater chronic criterion 230 mg/l 835 uS/cm Freshwater acute criterion 860 mg/l 2755 uS/cm

Specific Conductance (uS/cm)	Category
0 — 100	Normal
101 – 200	Low Impact
201 – 500	Moderate Impact
> 501	High Impact
> 835	Exceeding chronic chloride standard

# **Total Phosphorus (TP)**

□ Unit of Measurement: Milligrams per liter (mg/l)
 □ Description: Measure of all forms of phosphorus in the water (inorganic and organic). Limiting nutrient in freshwater.
 □ Sources: Natural (soil/rocks), Human (sewage, animal manure, fertilizer, erosion)
 □ Importance: Excess amounts can trigger nuisance algal blooms and aquatic plant growth, which can decrease O₂ levels and

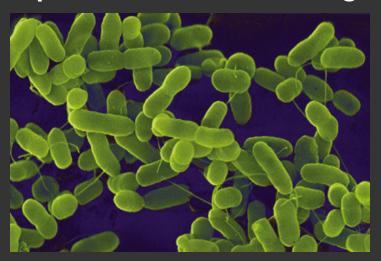
attractiveness of waters.

# NH Surface Water Quality Standards

□ Class A/B NH Surface Water Quality Standard: There is no numeric standard for total phosphorus for Class A/B waters, in process of developing nutrient criteria.
☐ The narrative standard states that "unless naturally occurring, shall contain no phosphorus in such concentrations that would impair any existing or designated uses."
☐ Draft numeric nutrient criteria developed for VT and ME surface waters indicate a maximum allowable summer mean TP level of approximately 0.035 mg/L.
□ Although this value is approximately two to three times typical natural background levels in many rivers and streams, it is considered protective of all designated uses (i.e., swimming, aquatic life, etc). in VT and ME.
☐ Possible that TP criteria for NH rivers and streams will be similar.

# Escherichia Coliform (E.coli)

- ☐ Unit of Measurement: Counts (or colonies) per 100 mL
- □ Description: Indicator of potential presence of pathogens in freshwater. Normal component in large intestines of humans and other warm-blooded organisms.
- ☐ Sources: Human and animal waste.
- ☐ Importance: Good indicator of fecal pollution and possible presence of pathogenic organisms. Concentrations help determine if water is safe for recreational purposes such as swimming.



## NH Surface Water Quality Standards

- □ Class A NH Surface Water Quality Standard: Unless naturally occurring, shall contain not more than either a geometric mean of 47 *E.coli* cts/100 mL based on at least three samples obtained over a sixty-day period, or greater than 153 *E.coli* cts/100 mL in any one sample.
- □ Class B NH Surface Water Quality Standard: Unless naturally occurring, shall contain not more than either a geometric mean of 126 *E.coli* cts/100 mL based on at least three samples obtained over a sixty-day period, or greater than 406 *E.coli* cts/100 mL in any one sample.

# **VRAP Sampling Refresher**







# NH Volunteer River Assessment Program Annual Training Workshop

May 14, 2011

## **VRAP Equipment Kits Contain:**

### **Meters:**

- ☐ YSI 85 Multimeter or YSI 95 Dissolved Oxygen Meter
- ☐ YSI 85 Multimeter or YSI 95 Conductivity Meter
- ☐ Oakton pH 11 Meter or Orion 210 pH Meter
- □ LaMotte 2020e Turbidity Meter or LaMotte 2020 Turbidity Meter
  - 0.0 NTU (DI Blank), 1.0 NTU, 10.0 NTU, Sample Vial

### **Standards:**

- ☐ 7.0 pH Buffer
- ☐ 4.0 pH Buffer
- ☐ 6.0 pH Buffer
- □ pH Electrode Storage Solution
- ☐ Zero Dissolved Oxygen Solution
- ☐ 2,000 uS Conductivity Standard

### Supplies:

- □ Bucket/Reel
- □ De-Ionized (DI) Water/Bottle
- □ Kimwipes
- ☐ Small Plastic Bowl (for turbidity, pH)
- □ Extra Batteries
- ☐ Troubleshooting Guide

# Water Quality Monitoring Sampling Protocols

### **Bring into the field!**

#### "Newer" Meters:

http://des.nh.gov/organization/divisions/water/wmb/vrap/documents/protocols\_new\_meters.pdf

#### "Older" Meters:

http://des.nh.gov/organization/divisions/water/wmb/vrap/documents/protocols\_old\_meters.pdf

**NH Volunteer River Assessment Program** 

Water Quality Monitoring Sampling Protocols
For Volunteer Monitors

LaMotte 2020e Turbidity Meter

Oakton pH 11 Meter

YSI 85 Water Temperature/Dissolved Oxygen/Conductivity Meter



#### New Hampshire Department of Environmental Services

29 Hazen Drive / PO Box 95
Concord, NH 03302-0095
http://des.nh.gov/organization/divisions/water/wmb/vrap/index.htm

April 2011

## Safety in the Field

(Page 4 of Protocols)

### General

- ☐ Always monitor with at least one person.
- ☐ Listen to weather reports and use caution if inclement weather is forecasted.
- ☐ Have a first-aid kit accessible.
- ☐ If you feel uncomfortable about the condition of the stream or your surroundings, terminate monitoring efforts for the day.



# Safety in the Field Continued

### **Stream Safety**

- ☐ Do not enter the water if the stream is at flood stage.
- ☐ Streambeds composed of coarse substrates and/or bedrock can be slippery and have deep pools.
- ☐ Streambeds composed of finer substrates can prove treacherous in areas where mud, silt, or sand creates unstable terrain.
- ☐ If you must cross the stream, use a walking stick to steady yourself and to probe for deep water and unstable terrain.





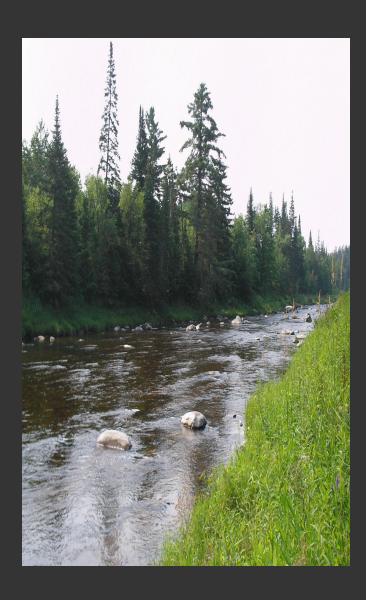
## What Parameters Are Monitored?

### Basic

- ☐ Turbidity (NTU)
- □ pH (Standard Units)
- **□** Water Temperature (C)
- ☐ Dissolved Oxygen Saturation (%)
- ☐ Dissolved Oxygen Concentration (mg/L)
- □ Specific Conductance (μS)

### **Additional**

- ☐ Escherichia coli/Bacteria (cts/100 mL)
- ☐ Total Phosphorus (mg/L)
- □ Chloride (mg/L)
- □ Metals
- ☐ Other parameters as deemed appropriate to the group's Sampling & Analysis Plan



## Completing the VRAP Field Data Sheet

(Page 6 of Protocols)

	vironmental Services	1	NH Volu	inteer R 2011 F		ssessme Data She	_	ram	Activity ID: Date Entered Date Proofed:		By:	
VRAP G	roup:	I	Date:/	/2011	Start Tir	me:	_End Time:		Associated La	ab Data?	Yes No	
Voluntee	er Monitors (First	& Last Na	nes):									
Initial Turbidity Meter Check Value:					3	Time Dissolved Oxygen Meter Turned On:  Time of 1st Dissolved Oxygen Calibration:						
NHDES Station ID	Station Name Or Description	Time Sampled (HHMM)	Turbidity (NTU)	pH Calibration Slope (92-102%)	pH (Units)	Dissolved Oxygen Calibration Value	Dissolved Oxygen (% saturation chamber reading)	Water Temp (°C)	Dissolved Oxygen (% Sat)	Dissolved Oxygen (mg/L)	Specific Conductance (µS)	
					REPL	ICATE			1			
				O.	A/OC ME	TER CHECK						
Dissolve	ed Oxygen Zero Ox	ygen Readin	g (% Sat): _	_			Station:		Tim	e:		
6.0 pH Buffer Reading (5.8 - 6.3): Station: Time:  DI Turbidity Blank Reading (0.0): Station: Time:												
DI Turb	idity Blank Readin	ng (0.0):	_				Station:		Tim	e:		
END OF DAY METER CHECK  Conductivity (2,000, 200, or 100 µS std.):  Turbidity (1.0 std.):												

Did you collect **Laboratory Samples** today?  $\square$  Yes  $\square$  No If yes, **which lab** were the samples relinquished to?  $\square$  NHDES  $\square$  PSU  $\square$  UNH  $\square$  Other **Scribe** (Please Print First & Last Name):

## Completing the VRAP Field Data Sheet

(Page 6 of Protocols)

One person should perform all of the data entry on the VRAP Field Data Sheet for that particular sampling date so that entries are consistent.

Please Write in Black /Blue Pen and
☐ Enter data neatly, legibly, and thoroughly so that there is not any missing, incomplete, or incorrect information.
☐ Ensure that all sections are completed before moving to the next sampling station.
☐ If a parameter cannot or was not measured (i.e., instrument failure), record the reason for the missing data under the "Comments" section on the back.
☐ When the observations have been completed for a station, review the field data sheet to ensure that all the necessary data are accurately recorded and that everything is legible.
☐ If an error is made in recording data, do not erase. Draw a single pencil line through the incorrect values and enter the correct values.
☐ Legibly print the first and last name of each volunteer for that particular sampling date on the VRAP Field Data Sheet, so that we can give all volunteers proper credit!

# Submitting VRAP Field Data Sheets

(Page 6 of Protocols)

□ VRAP Field Data Sheets can be mailed to:

NH Volunteer River Assessment Program
NH Department of Environmental Services
Watershed Management Bureau
29 Hazen Drive PO Box 95
Concord, NH 03302-0095

- ☐ They can also be e-mailed as PDF to jen.drociak@des.nh.gov or faxed to (603) 271-7894 (no pencil).
- □ Please submit Field Data Sheets <u>as soon as possible after data</u> <u>collection</u> so that VRAP staff can enter and perform QA/QC data checks in a timely manner.
- ☐ Please do not wait until the end of the sampling season to submit all of your data sheets!

### Completing the NHDES Laboratory Services

### Custody Sheet (Page 9 of Protocols)

### 

Station ID	Date Time Sampled	# of Containers	Matrix	ТР	EC			Sampler Comments	Lab Login #
01-BKB	Same				-1				
OI-BKB	date &	2	AQ	√	√				Leave Blank
	time								
01-BKB-REP	as on	2	AQ	V	٧				
	your								
	field								
	data								
	sheet!								

Relinquished By Your Name Relinquished By VRAP Staff		Received By VRAP Staff	Section No.: 22.0 Revision No.: 6 Date:4-8-10 Page 1 of 1
Matrix: A= Air S= Soil AQ= Aqueous (	Ground Water, Surface Water, Drin	king Water, Waste Water)π Other:	

Data Reviewed By Leave Blank

# Collecting Samples for Field & Laboratory Analysis

(Page 7 of Protocols)

### **Order of Field Tests:**

- □ Pour and/or collect samples for laboratory analysis
- ☐ Turbidity
- □ pH
- □ Water Temperature
- □ Dissolved Oxygen
- □ Specific Conductance



## Collecting Samples for Field Analysis

### Label Sample Bottles Prior to Filling

- □ NHDES Station ID (Important!)
- □ Date
- ☐ Time of collection
- ☐ Test (s) requested
- ☐ Collector's Initials

01-BKB 05/14/11 08:00 Total Phosphorus (TP)

J. Drociak

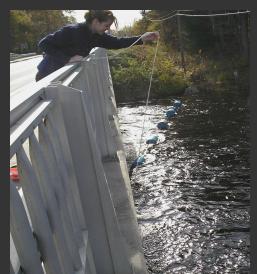


**Use permanent pen or Sharpie!** 

If you make your own labels, make sure they are waterproof!

# Collecting Samples for Field Analysis: Method 1: Bridge Sampling (Page 7 of Protocols)

- 1) Lower the bucket into the river from the upstream side of the bridge (water flowing toward you).
- 2) Fill ¼ of the bucket with water.
- 3) Pull the bucket up, swish the water around in it to rinse, and discard the rinse water off the downstream/opposite side of the bridge. Repeat this process two more times.
- 4) Return the bucket into the river from the upstream side of the bridge and slowly fill  $\frac{1}{2}$   $\frac{3}{4}$  of the bucket with water (you may wish to weight one side of the bucket).
- 5) Slowly pull up the bucket with sample water. Do not to bump the bucket against the bridge or otherwise agitate the sample water in the bucket as this may introduce additional oxygen and sediment and may yield inaccurate readings.
- 6) Carefully carry the sample to a safe location for analyses. Do not place the sample bucket in direct sunlight or on hot pavement as this may alter water temperature and dissolved oxygen measurements and may yield inaccurate readings.





# Collecting Samples for Field Analysis: Method 2: Off-Shore Sampling (Page 8 of Protocols)

- 1) Carefully wade out into the river as close as possible to the center (to collect the most representative sample). Do not enter water above your waist and be sure someone on shore knows where you are.
- 2) Facing upstream (water flowing toward you), rinse the bucket with water. Do not collect the water that is running over your legs/boots. Discard the rinse water behind you, downstream. Repeat this process two more times.
- 3) With the bucket held in front of you, dip the lip of the bucket into the flowing water slowly fill  $\frac{1}{2}$   $\frac{3}{4}$  of the bucket with water.
- 4) Carefully carry the sample to a safe location for analyses. Do not place the sample bucket in direct sunlight or on hot pavement as this may alter water temperature and dissolved oxygen measurements and may yield inaccurate readings.

## Collecting Samples for Laboratory Analysis: Eschericia coli (E.coli / Bacteria)

### In General

- ☐ Sterilized.
- ☐ Avoid touching the neck, inside the bottle, or cap to prevent contamination.
- ☐ Please leave some air at the top of the bottle to allow sample to be shaken by lab staff.
- □ 6-Hour Holding Time.
- □ \$20.00 Sample at NHDES.
- □ WWTF/Other Labs.



### Collecting Samples for Laboratory Analysis: E.coli / Bacteria

### **Bridge Sampling**

☐ Fill a sterilized *E.coli* bottle using the water in the bucket. This should be done immediately after the bucket sample is collected.

### **Off-Shore Sampling**

- Wade out into the river and sample about knee deep or midway between the top and bottom of a flowing stream.
- ☐ Remove the cap of a sterilized *E.coli* bottle when you are ready to collect the sample.
- □ Point the mouth of the bottle down towards the water's surface.
- □ Using a continuous "U"-shaped motion, thrust the bottle under the water's surface and fill in one continuous upstream motion (away from you), turning the bottle right side-up at the bottom of the "U". In this fashion, the water will flow into the bottle, then over your hand. If sampled in a downstream fashion, the water would flow over your hand then into the bottle causing contamination from the sampler.

# Collecting Samples for Laboratory Analysis: Total Phosphorus (TP) & Total Kjeldahl Nitrogen (TKN)

### In General

- □ Non-Sterilized.
- ☐ Very strong ACID preservative.
- ☐ Will burn the skin on contact.
- ☐ Should only be filled by from another bottle or a bucket.
- □ Please leave some air at the top of the bottle to allow sample to be shaken by lab staff.
- **□** 28-Day Holding Time.
- □ \$20.00 Sample at NHDES.



# Collecting Samples for Laboratory Analysis: Chloride

### In General

- □ Non-Sterilized.
- ☐ No acid preservative.
- □ Please leave some air at the top of the bottle to allow sample to be shaken by lab staff.
- **□** 28- Day Holding Time.
- ☐ Free!

# Collecting Samples for Laboratory Analysis: Before You Return to the Laboratory

□ Contact the VRAP Coordinator to schedule sample drop-off. VRAP staff will meet you in the lab, check the field data sheet(s), lab custody sheet(s), sample bottles, and prepare any bottles and supplies you may need for your next sampling date.
☐ Keep your samples on ice in a dark cooler from the time of collection to the time you relinquish samples to the lab.
☐ Have your field data sheet(s) and Laboratory Custody Sheet completed beforehand.
☐ Monday – Thursday return samples to the laboratory before 3:00pm.
☐ Fridays - return samples to the laboratory before 11:00am.

# A Few Reminders About the LaMotte 2020/2020e Turbidity Meters

- ☐ Align arrow/notch on vial with arrow on meter.
- ☐ Keep vials clear of condensation, water, dirt, fingerprints with Kimwipes.
- □ Ensure standards are filled to neck of bottle.
- □ 2020e Only need to Scan Blank at beginning of day (calibration).





# A Few Reminders About the YSI 85 Multimeter / YSI 95 DO Meter

- ☐ Keep sponge moist at all times.
- Only push probe in as far as rubber ring (not all the way).
- ☐ YSI 85 Only: First: Turn on & Check 2,000 conductivity standard.
- ☐ Wait 15 minutes before calibrating for dissolved oxygen.
- ☐ Keep on all day!
- ☐ Ensure water sample covers all openings of probe.
- □ DO Calibration Value is KNOWN VALUE based on altitude.
- DO % Saturation Chamber Reading should be within 2% of calibration value.
- □ When measuring dissolved oxygen, let % saturation stabilize, take reading, them <a href="MMEDIATELY">IMMEDIATELY</a> press mode and take mg/L concentration value.



# A Few Reminders About the YSI 85 Multimeter / YSI 30 Conductivity Meters

- ☐ Flashing C for Specific Conductance!
- ☐ Quick to stabilize.
- ☐ Holes in probe <u>completely immersed in</u> <u>standard</u> when checking.





# A Few Reminders About the Oakton pH 10/Orion 210 Meters

### **Both Meters**

- ☐ Make sure to use small dish to sample from!
- □ Do not touch/wipe glass bulb.
- ☐ If no pH Electrode Storage Solution Store in 4.0 pH Buffer; Never DI water!

### Oakton pH 11

- Meter will instantly read "Ready" and give a reading, but will then slowly inch up.
- □ Let pH measurement stabilize (1-2 minutes)!
- Careful Bottles tipsy!

### Orion 210

- Blue plug out of probe when calibrating/sampling.
- ☐ Blue plug in probe when not in use.
- ☐ Slow(er) to calibrate and read!



# General Sampling Reminders

Calibrate the pH and dissolved oxygen meters before <u>each</u> measurement! Do not turn off the dissolved oxygen meter until the end of the day! Run a replicate sample once a day! Test the pH 6.0 buffer, turbidity DI blank, and zero oxygen once a day (QA/QC Meter Checks)! Check the conductivity meter with the known standard at the beginning & end of the day! □ Calibrate the turbidity meter with the 1.0 NTU standard at the beginning of the day and check it with the 1.0 NTU standard at the end of the day. Rinse everything with DI water - a lot!

### For More Information

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